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ASSESSING THE EFFECTIVENESS OF A MASTERY TEACHER EDUCATION PROGRAM

by

Donald A. Camplese and Robert E. Hale

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Assessing the Effectiveness of a Mastery Teacher Education Program

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Abstract

Student teachers trained in a Competency Based Teacher Education Program were compared to student teachers trained in a Traditional Lecture-Discussion Program with respect to their use of positive reinforcement and aversive stimuli and the incidence of student talk. Analyses indicated that student teachers trained in a competency based program used more positive reinforcement, less aversive stimuli and evoked more student talk than did student teachers trained in a traditional program. Student participation in the form of student talk was found to be positively correlated with positive reinforcement and negatively correlated with aversive stimuli.

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the literature reveals but a handful of research investigations which have explicitely tested the relationship between the professional preparation of teachers and subsequent classroom performance. The assumption that teacher education influences teaching behavior is essentially just that - an assumption. Teacher preparation is basically "an unstudied problem."

Berry (2) and Dalton(3), in separate investigations, detected a positive relationship between the number of professional education hours of teachers and subsequent performance. These studies revealed that fully certified fitst-year teachers who had completed prescribed courses in education were rated significantly higher by trained observers and proved to be more effective than provisionally certified first-year teachers who lacked all or part of the state prescribed education courses. Howerver, other research has indicated little evidence that teacher competency is related to teacher preparation (1, 4, 8).

The ultimate objective of teacher education is to modify the actual instructional behavior of pre-service teachers in desirable directions before student teaching. In an attempt to attain this goal, the Educational Psychology Department at West Virginia University modified its Education 105 and 106 program which dealt with topics concerning the nature of the learner and the learning process through a lecture discussion approach. The former method

is herein referred to as the Lecture-Discussion Method. Some of the salient features of the modified program which differentiated it from the (LD) approach are: (1) The content was broken into instructional units with behavioral objectives stated in terms of terminal student behavior with a minimum acceptance level of student performance specified in advance for each objective. (2) Instructional means and materials were provided through which the objective could be attained. The instructional means included video and slidetapes, films, programmed materials and text books in addition to individual conferences with professors and graduate students. (3) That the students were actively involved in the learning situation at all times was insured via active involvement sheets during films, tapes, etc. (4) The student progressed through the units at his owm rate and was permitted to test out when he was ready. Remedial instructional materials were provided for those who failed to achieve at the specified level. This modified method is herein referred to as the Mastery (M) Method. The M program obviously has as its base, Reinforcement Theory.

To evaluate the effectiveness of this or any teacher education program, one must consider the ultimate objective of the program - the teacher's performance in the classroom. Obviously, not all aspects of the multidimensional teaching-learning process can be investigated at one time. Thus the investigators have chosen to study verbal behavior, only one minute aspect of total teacher behavior. Verbal be-

havior which has been analyzed in this study includes only the audible expression of teacher and pupil talk. Verbal behaviors in the form of positive reinforcement, aversive stimuli, and student verbal talk behavior were selected as important aspects of the teaching-learning process worthy of systematic analysis and study for the following reasons; (1) teaching behavior is primarily verbal (2) the teacher's verbal behavior is the one facet of teaching that can be modified and (3) student verbal behavior can be modified through the teacher's use of praise, acceptance, clarification, and the extension of student ideas.

The study of verbal behavior in the classroom has, in the past few years, amassed an impressive body of literature concerning the relationship between verbal behavior and teacher effectiveness and/or student achievement. In one such study Pankratz(6) looked at the difference between the verbal interaction patterns of effective and less effective high school science teachers. Pankratz concluded that a relationship existed between teacher verbal behavior and teacher effectiveness to the extent that (1) the effective teachers used more praise, clarification and acceptance, and less criticism, rejection, and irrelevant behavior than the less effective (2) the I/D ratios (the ratio of indirect to direct student talk) of the effective group were more than eight times greater, and (3) the effective group used significantly more extended talk for the purpose of building on the amplification of student ideas. Both groups lectured about one-half of the time.

For the purpose of this investigation Positive Reinforcement (PR) refers to the verbal behavior of a teacher which tends to praise, accept, or amplify the verbal contribution of a student. Aversive Stimuli (AS) refers to the verbal behavior of a teacher which tends to create or maintain rejection or criticism of the behavior of a student, and Student Talk (ST) refers to any verbal expression by a student.

The instrument chosen to measure classroom incidence of positive reinforcement, aversive stimuli and student talk was Ober's Reciprocal Category System (RCS) (5), an observational system designed to assess teacher-student classroom verbal interaction. The RCS consists of nine verbal categories, each of which can be assigned to either teacher or student talk, and a single category reserved for silence or confusion (see Appendix I for category descriptions). When verbal behavior is observed as teacher talk its category number (1 through 9) is recorded. In contrast, when verbal behavior is observed as student talk, its category number (11 through 19) is recorded. A recording is made every three seconds. The here used definition of positive reinforcement is in direct agreement with categories 1, 2, and 3 of the RCS and the definition of aversive stimuli is in direct agreement with categories 8 and 9. Student talk in general is not restricted to categories.

The writers then accepted the following: (1) positive reinforcement is conducive to learning and is desirable, (2) aversive stimuli is detrimental to learning and is undesirable, and (3) student talk in the form of participation in a

classroom discussion is desirable.

Having accepted these propositions, the purpose of the investigation was to compare student teachers who were trained under the M method to student teachers trained by the LD method. Specifically it was hypothesized that student teachers trained under method M would display greater use of positive reinforcement, less use of aversive stimuli and would elicit more student talk than student teachers trained under the LD method. It was also hypothesized that there exists a significant multiple correlation between student talk and a linear combination of positive reinforcement and aversive stimuli.

Sixty subjects were selected at random for the study from a group of one hundred student teachers who were enrolled in Educational Methods, the student teaching course at a state university in West Virginia. The mastery group consisted of thirty subjects, fifteen from elementary education and fifteen from secondary, all of whom had taken the modified general educational psychology course, Method M. The lecture discussion group consisted of thirty subjects, fifteen from elementary education and fifteen from secondary, all of whom had taken the general educational psychology course, without modification, Method LD. The content, specifically reinforcement theory, was the same for the two groups. Both groups of student teache completed identical education prerequisites with the exception of the general methods course which obviously differed for secondary and elementary classifications. However, any difference due to this factor which might be reflected in the terminal performance of the groups, is controlled for in the balanced

design.

The training received in the general methods courses, which included an opportunity to teach while being observed; audio taped, and video taped, provided a two week adaptation period prior to student teaching which helped eliminate the artificial situation produced by the use of a tape recorder during observation. The student teachers were not aware of this study.

The data were secured during the second week of student teaching. A twenty minute audio tape recording was taken on each student teacher. These audio tape recordings were analyzed by a team of three raters via the RCS system of interaction analysis. Nearly one hundred percent agreement of the specified categories indicating the incidence of positive reinforcement, aversive stimuli, and student talk was obtained by using the RCS in the following manner. The incidence of PR was the incidence of categories 1, 2, or 3. These categories were recorded as prescribed by the rationale set forth in the RCS, with the exception of category 3; when category 3 appeared in a series, only the first recorded response was tabulated and counted as positive reinforcement. The incidence of AS was the incidence of categories 8 or 9 recorded as prescribed in the RCS rationale. The incidence of ST was the incidence of student verbal behavior and was tabulated without regard to the student talk categories prescribed by the RCS rationale.

To test whether the M Group out performed the LD Group three Randomized Complete Block Analyses of Variance (7)

were conducted. Tables of the results of those analyses as well as tables of means follow:

TABLE I
ANALYSIS OF VARIANCE
POSITIVE REINFORCEMENT

Source	DF	Sum of Squares	MS	F
Classification	1	93.75	93.75	1.61
Method	1	700.42	700.42	12.05*
Classification x Method	1	.15	0.15	0.00
Error	56	3255.87	58.14	
Total	59	4050.18		

TABLE II
MEANS
POSITIVE REINFORCEMENT

	M	L-D	
Elementary	19.00	12.27	15.63
Secondary	21.60	14.67	18.13
	20.30	13.47	16.88

TABLE III
ANALYSIS OF VARIANCE
AVERSIVE STIMULI

Source	DF	Sum of Squares	MS	F
Classification	1	0.82	0.82	.03
Method	1	277.35	277.35	9.60*
Classification x Method	1	2.82	2.82	0.10
Error	56	1617.60	28.89	
Total	59	1898.58		

TABLE IV
MEANS
AVERSIVE STIMULI

	M	L-D	
Elementary	2.60	7.33	4.97
Secondary	3.27	7.13	5.20
	2.93	7.23	5.08

TABLE V
ANALYSIS OF VARIANCE
STUDENT TALK

Source	DF	Sums of Squares	MS	F
Classification	1	47264.27	47264.27	17.08*
Method	1	65076.27	65076.27	23.52*
Classification x Method	1	3024.59	3024.59	1.09
Error	56	154936.81	2766.73	
Total	59	270301.94		

TABLE VI
MEANS
STUDENT TALK

	M	L-D	
Elementary	226.07	146.00	186.03
Secondary	155.73	104.07	129.90
	190.90	125.03	157.97

The hypotheses were supported in all three cases, as evidenced by calculated F values which are significant at the .01 level (Tables I, III, and V). Thus, student teachers trained by the M Method did apply positive reinforcement more often, aversive stimuli less often, and evoked student talk more frequently than did student teachers trained by the L-D Method.

Though no hypotheses were formulated with respect to differences in Elementary and Secondary student teachers, the interested reader may note the results. Only for student talk was there a difference between the means of Elementary and Secondary student teachers. This difference is certainly not surprising. Note also that no interaction is significant.

To test the hypothesis that there exists a multiple correlation between Student Talk and a linear combination of Positive Reinforcement and Aversive Stimuli, a multiple regression analysis(7) was conducted. The results are given below:

Constant		106.47
Coefficients	PR	4.43
	AS	-4.58
Standard Error of Y		51.65
R		.66
Total F		22.16*

The correlation coefficient is significant at the .01 level. Note that the weighting on PR is positive whereas for AS it is negative indicating that the incidence of PR is directly related to the incidence of ST whereas the in-

cidence of AS is inversely related to the incidence of ST.

The results of this study show that the performance of teachers in the classroom is influenced by their training in a teacher education program. A group of student teachers who learned reinforcement theory through the application of its principles in turn applied reinforcement theory more than did student teachers who were trained through a traditional lecture-discussion method. Though the aspect of teaching here investigated is only a minute part of the entire picture, the results are encouraging. The data show that teacher education programs do have an effect on the ultimate objective of such programs - the performance of the teacher in the classroom.

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Appendix I

Categories for the Reciprocal Category System

Category Number Assigned to Teacher	Description of Verbal Behavior	Category Number Assigned to Student
1.	"WARMS" (INFORMALIZES) THE CLIMATE: Tends to open up and/or eliminate the tension of the situation; praises or encourages the action, behavior, comments, ideas, and /or contributions of another; jokes that release tension not at the expense of others; accepts and clarifies the feeling tone of another in a friendly manner (feelings may be positive or negative; predicting or recalling the feelings of another are included).	11
2.	ACCEPTS: Accepts the action, behavior, comments, ideas, and/or contributions of another; positive reinforcement of these.	12
3.	AMPLIFIES THE CONTRIBUTIONS OF ANOTHER: Asks for clarification of, builds on, and/or developes the action, behavior, comments, ideas and/or contributions of another.	13
4.	ELICITS: Asks a question or requests information about the content subject, or procedure being considered with the intent that another should answer (respond).	14
5.	RESPONDS: Gives direct answer or response to questions or requests for information that are initiated by another; includes answers to ones own questions.	15
6.	INITIATES: Presents facts, information, and/or opinion concerning the content, subject, or procedures being considered that are self-initiated; expresses one's own ideas; lectures (includes rhetorical questions-- not intended to be answered).	16
7.	DIRECTS: Gives directions, instructions, order, and/or assignments to which one is expected to comply.	17
8.	CORRECTS: Tells another that his answer or behavior is inappropriate or incorrect.	18
9.	"COOLS" (FORMALIZES) THE CLIMATE: Makes statements intended to modify the behavior of another from an inappropriate to an appropriate pattern; may tend to create a certain amount of tension (i.e., Bawling out someone, exercising authority in order to gain or maintain control of the situation, rejecting or criticizing the opinion or judgment of another).	19
10.	SILENCE OR CONFUSION: Pauses, short periods of silence, and periods of confusion in which communication cannot be understood by the observer.	